New Zealand Biosecurity Institute

National Pest Control Agencies

Pests in our Dynamic Landscapes: The pressure is on!

NETS2012
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Welcome...

...to the 62nd annual NZBI National Education and Training Seminar (NETS). The shared theme for Biosecurity Month and NETS this year is 'The Pressure is On' and I think that we can all appreciate the significance of the rising pressure within our biosecurity industry. Super-Ministry mergers, local government reforms, and the ever-tightening of belts at all levels, means that now more than ever, we need collaborative vision, purpose, and effort to overcome these constraints and remain a world-leader in biosecurity innovation and implementation.

Let me ask you, what could epitomise multi-agency collaboration better than the NZBI? This year the NZBI and NPCA are joining forces to host NETS for the first time, and I think that we should celebrate the fact that, at the coal face, we can all see the strength that is borne from working together. Just as biosecurity practitioners from around the country descended upon Auckland to lend a hand with the Queensland fruit-fly incursion, here we all sit today to share in our successes and learn from our lessons.

The organising committee have all worked hard to bring you a programme of speakers, workshops and field trips that will be like a mid-winter shot in the arm to rejuvenate, invigorate and inspire the collective fire in our bellies. Our thanks to the organising committee chair, Darion Embling and his team, Craig Davey, Trevor James, Kerry Bodmin, Bill Martyn, Maurice Kennedy, Alice McNatty, Dean Roughton, Mike Karl, Kevin Loe, Wendy Mead, Heidi Pene and conference organiser Carolyn Lewis for all the hard yards it's taken to get here today.

As always, we couldn't produce a seminar as professionally organised as NETS without the generous support of our sponsors, so our sincerest thanks to the Bay of Plenty Regional Council, Hawkes Bay Regional Council, Waikato Regional Council, Horizons Regional Council, the Ministry for Primary Industries, Weedbusters, Key Industries, Pest Management Services, Landcare Research and Animal Control Products.

As we open NETS2012, let me ask you all to make the very most of our time together. Let us all share our knowledge and experience with one another, and strengthen the relationships between our organisations. The mission of the NZBI is to work together to ensure New Zealand is protected from the adverse impacts of invasive species, so don't forget that's why we are here - as an industry the pressure is on us to make it happen.

- Pedro Jensen, NZBI President

It is my pleasure to extend a warm welcome to 2012 conference participants. It is the first conference that brings together the NPCA's annual conference with NETS. The mutual benefits in aligning both technology transfer events in this way are evident in the conference programme with its expanded vertebrate pest control content. In particular from NPCA's perspective it is an opportunity to present on the latest research and best practice aspects of vertebrate pest control. At the same time the conference papers are of direct relevance to NPCA's target audience group of pest control practitioners and contractors.

The conference is an important forum for practitioners to keep up to date with new research and technical developments and exchange ideas with researchers and colleagues. I am pleased to recommend the 2012 programme to all those involved with pest control. The conference planning committee have done an excellent job and have met the challenge of incorporating the expanded vertebrate pest content into a programme that will be of interest to all.

- Bill Martyn, NPCA Chair

Day 1 Wednesday 18 July 2012

9.30 Powhiri

9.45 Official welcomes - NZ Biosecurity Institute President and National Pest Control Agency Chairperson

10.00 Laurie Burdett, Waikato Regional Council

10.25 Housekeeping

10.30 *Morning tea*

11.00 Biological Invasions in South Africa and its National Parks
Llewellyn Foxcroft, Programme Manager - Invasion Ecology, Conservation Services, South African National Parks

11.45 Building Conservation Intelligence: engaging communities in the work that we do
'Didymo Dave' Cade, Department of Conservation

12.10 Pest control: how do we know if the pressure is working?
Chris Jones, Landcare Research

12.30 *Lunch*

	WEEDS	INSECTS & DISEASES	VERTEBRATE PESTS
1.30	Field horsetail – from the Cretaceous to the Central Districts *Craig Davey, Horizons Regional Council*	The Japanese pine sawyer beetle: An unwanted visitor *Emmanuel Yamoah, MinforPrimary Industries*	Assessing the sensitivity of interference based monitoring devices to possum presence *Matt Kavermann, Lincoln University*
1.50	Old Mans Beard in the Landscape – the pressure is ON! *Kay Griffiths, The Conservation Company*	Overview of the New Zealand Fruit Fly Surveillance Programme and a review of the current science and stratigies used. *Rory MacLellan, MinforPrimary Industries*	Non-target monitoring following aerial 1080 possum control in the Hauhungaroa Ranges *Grant Morris, Landcare Research*
2.10	The biological control of tutsan in New Zealand *Hugh Gourlay, Landcare Research*	Landscaping & termites: the 'Quiet Sleeper' *Shaun Bennett, MinforPrimary Industries*	Using less 1080 in aerial baiting: cluster- and strip-sowing update *Grant Morriss, Landcare Research*
2.30	Wilding conifer management - a changing landscape. *Sherman Smith, MinforPrimary Industries*	Control Options, Argentine and Darwin ants *Melissa Mathieson, NZBI Study Award Recipient*	Pindone residues in rabbits *Bruce Warburton, Landcare Research*

2.50 *Afternoon tea*

	COMMUNITY ENGAGEMENT	AQUATICS & MARINE	VERTEBRATE PESTS
3.20	Powering up weed workshops. *Sara Brill, Northland Regional Council*	Marine pests – a regional council perspective *Gail Townsend, Northland Regional Council*	Proving TB Freedom in North Canterbury *Mandy Barron, Animal Health Board*
3.40	Hauraki Gulf Island Biosecurity - an assessment of ferry passenger awareness *Lydia Tyrrell, Unitec Institute of Technology*	A national HSNO approval for spraying in aquatic environments. *James Bevan, Latitude Planning Services Ltd*	Lures to monitor and control vertebrate pests at low densities: sex pheromone attractants *Janine Duckworth, Landcare Research*
4.00	Counteracting pseudoscience, scuttlebutt, and scaremongering in the 1080 debate *Alan Dicks, Animal Health Board*	Joint-agency response to *Undaria pinnatifida* in the Fiordland Marine Area - two years on..... *Jenny Brunton, MinforPrimary Industries, and Tim Riding, Environment Southland*	Monitor & Manage the Marsupial Menace - computer games for decision making *Bruce Warburton, Landcare Research*
4.20	Kauri dieback; an emerging biosecurity threat to New Zealand's iconic kauri forests *Nick Waipara, Auckland Council*	Pouto dune lakes - what makes them special and how are we managing them *Jillian Fulcher, Northland Regional Council*	Refining operational practices for controlling rabbits on agricultural lands *Grant Morriss, Landcare Research*

4.45 *New Zealand Biosecurity Institute Annual General Meeting*

6.00 *Mix 'n' Mingle*

Day2Thursday19July2012

9.00 Problems and solutions to invasive species – the Kruger experience
Llewellyn Foxcroft, Programme Manager- Invasion Ecology, Conservation Services, South African National Parks

9.45 Two Minute Biosecurity Gems

9.55 From Pets to Pests – Assessing the biosecurity risks within the pet trade
Jaap Knegtmans, Ministry for Primary Industries

10.15 NETS2012 poster paper presentations

10.30 *Morning tea*

	WEEDS	AQUATIC	VERTEBRATE PESTS	VECTOR CONTROL
11.00	A herbicide spraying system to control wilding conifers in New Zealand *Peter Raal, Dept of Conservation*	Biodiversity & Biosecurity – a hydro-generator's perspective *Cam Speedy, Genesis Energy*	Self-resetting traps for ground based pest control for conservation in New Zealand forests – early results *Craig Gillies, Dept of Conservation*	Eliminating wilding deer in Northland - lessons learned from a multi-agency response. *Don Mckenzie, Northland Regional Council*
11.20	Demonstrating cause and effect in weed biocontrol: St. John's wort as a case study *Ronny Groenteman, Landcare Research*	Weed cordons: are they an effective biosecurity tool? *Hamish Lass, Bay of Plenty Regional Council*	How good are we at trapping possums? Possum interaction rates with traps. *Samantha Brown, Landcare Research*	Amendment of the National Pest Management Strategy for Bovine Tuberculosis: approaches for eradication of tuberculosus from wildlife in New Zealand *Matthew Hall, Animal Health Board*
11.40	Geothermal habitats in New Zealand and threats to their biodiversity values *Sarah Beadel, Wildland Consultants*	Lake Taupo protection schemes and farm nutrient management *Lawrie Donald, Waikato Regional Council*	A cheap single capture trap for stoats and rats *Grant Morriss, Landcare Research*	

12.00 *Lunch*

FIELDTRIPS

SOUTHERN LAKE TRIP – PESTS AND PEOPLE WITH PASSION
Join this bus trip to southern parts of Taupo to meet locals with a passion for the environment and learn about projects such as south Taupo wetland willow control, Project Tongariro, Pukawa Wildlife Trust and the Blue Duck Trust. Stops include the stunning Lake Rotoaira, Stump Bay and Major Jones Bridge.
Trip leader: Craig Davey

CRUISING THE CRATER (LAKE TAUPO)
Hop on board the Cruise Cat for a trip on Lake Taupo. Sit back and relax while you cruise parts of the lake including Te Moenga Bay, Rangatira Point Maori carvings and Kinloch. You will hear about many of the issues affecting the lake, including catchment management riparian restoration and aquatic weeds.
Trip leader: Wendy Mead

BUSTING CLAYS
The annual competition for the clay bird shooting trophy takes place again, this year at the Taupo Gun Club. If you would rather kill than cuddle, and you reckon busting clays is your thing, have a go at getting your name on the trophy.
Trip leader: Dean Roughton

RANGITAIKI STATION
Come and visit Rangitāiki Station. At 9,694 ha this property is a large and diverse farm wintering over 81,000 stock units, including deer, sheep, beef and dairy grazers. Following intermittent TB issues during the 1990's, the property has been the focus for intensive vector control operations since 2000. In recent years, the Station has worked closely with Bay of Plenty Regional Council on protecting remaining areas of biodiversity value, particularly monoao frost-flats from invading Pinus contorta. Other recent pest issues on the property include rooks.
Trip leader: Richard Mallinson

TAUPO - MORE THAN A GEOTHERMAL WONDERLAND
This trip begins with a stop across the road at Wairakei Golf and Wildlife Sanctuary to look at restoration work and pest control. Then it's on to visit some of Taupo's geothermal sites to see rare and threatened plants, and learn about restoration works and weed control in these hotspots. This trip includes 'hot' stops at Craters of the Moon and Otumuheke Stream.
Trip leader: Kevin Loe

6.00 *Happy Hour*

7.00 *Conference Dinner*

Day 3 Friday 20 July 2012

WORKSHOPS

9.00

Weeds Database
Richard Bowman

Predictinghowandwhere differentweedsspreadis an important part of the work we do. Predictive modellingofweedriskis the next step to making this happen. This workshopwantstoutilise the expertise and data availableinNZanduseto itsfullpotentialatanational scale.

Pests & Communities
Craig Morley

Howdowegetcommunities interestedinconservation issuesandvalues?Howdo wefindwaystoengagethem to take part in pest control efforts? This workshop looksatpracticalwaystoget individualsandcommunities onboardwiththeworkthat wedo,andlendingahelping hand with tools that are available.

GPS,Photos&PlantID
Kevin Loe, Heidi Pene, Trevor James

MakethemostofyourGPS anddigitalcamerainthis funinteractiveworkshop aroundthegroundsofthe conferencevenue.Also get some guidance on submittingplantsamples for identification or herbarium records.

Monitoring (NPCA)
Bruce Warburton

Whichmonitoringmethod to use and for which speciesofvertebratepest? Thisworkshopwillcover thekeypointsinselecting correctmonitoringmethods with a focus on the strengthsandweaknesses ofeachmethodaswellas when and where to use them.

Toxins (NPCA)
Steve Hix

Thisworkshopandtraining sessionisonthesafeuse andhandlingofbothPAPP andzincphosphide.Itwill coverhowtopreparebaits forplacementinthefield andmayincludesomefield workinthegroundsofthe conference venue.

10.30 *Morning tea*

11.00 Workshop roundup

11.30 Closing address, Llewellyn Foxcroft

11.45 'Stook' Award, call to conference NETS2013, and conference closing

12.15 *Lunch*

Biological Invasions in South Africa and its National Parks

Llewellyn Foxcroft[1,2]
[1] Conservation Services, South African National Parks, South Africa
[2] DST-NRF Centre of Excellence for Invasion Biology, Stellenbosch University, South Africa.

Llewellyn started as a nature conservation student in the alien biota section of the Kruger National Park (KNP) almost 15 years ago. He managed Kruger's Working for Water project for two years before taking over as manager of the KNP Alien Biota section. Llewellyn continued his studies part time and completed his PhD through the University of Cape Town in 2007. In 2008 he joined the Centre for Invasion Biology at Stellenbosch University as a research associate/core team member. He transferred from the conservation management section to the scientific services division in 2001, to become the first ecologist to work on biological invasions and develop the KNP invasive species research programme. Llewellyn's work is focused on the science-management interface, working with park managers, rangers, Working for Water project managers and academic scientists. His work takes him to almost all South Africa's 19 National Parks, providing interesting insights into invasion ecology across a range of environmental gradients and habitats. He is also involved in developing and implementing monitoring programmes for detecting invasion trends at the park and at an organisational level.

South Africa, as in many regions globally, has a history of alien plant introductions dating back to the arrival of the first European colonists. Some of the most invasive and widespread species now requiring substantial management efforts were introduced in the early 1800s. For example, *Acacia longifolia* (long-leaved wattle), which is now widespread across South Africa, was introduced by a Kew Gardens collector in 1827.

By 1945 the level of invasion in the Cape Floral Kingdom, the smallest of the six recognised floral kingdoms of the world and a world heritage site, prompted a study on the status of the vegetation in the Western Cape. The report stated that "one of the greatest, if not the greatest, threats to which the Cape vegetation is exposed, is suppression through the spread of vigorous exotic plant species". Since then a large number of species have been recorded in South Africa, including about 280 reptiles and amphibians, and more than 60 fish. Additionally, 750 trees and 8000 herbaceous plants have also been introduced, of which 200 plants are declared as invaders by national legislation.

In 1998 a national survey estimated 10 million ha to be invaded, doubling by 2010 to 20 million ha. A range of invasive species have been studied in South Africa, with many results showing significant negative economic, social and biodiversity impacts. Notably, one study found a 55% reduction in stream flow in fynbos areas invaded by *Pinus radiata*. Fuelled by the concern over water losses from mountain catchment areas due to alien plant invasions, coupled with high levels of poverty in the country, the national government started the 'Working for Water' (WfW) Programme in 1995. Working for Water, focusing on the control of invasive alien plants for both biodiversity and social benefits, was started with a budget of R25 million (NZ$ 3.8 million). This budget has since been increased to R668 million (NZ$ 102 million), employing up to 20,000 people from poverty stricken areas in SA.

The SANParks programme forms one of the largest national Working for Water programmes, with a budget of nearly R80 million (NZ$ 12 million). These funds aid SANParks in managing invasive alien species across 3.9 million ha across 19 national parks. In total, 813 alien species have been listed across the SANParks estate, including 663 plants, 26 mammals, 16 fish and a number of insects and other organisms. Kruger National Park (~ 400 species; 350 plants, 50 animals) and Table Mountain National Park (~ 291 species; 239 plants, 52 animals) have the highest number of alien species. Most species are generally found to occur in human modified areas (67% for plants and 91% for animals), but alarmingly a high percentage also occur in natural areas, threatening a number of critically threatened species and habitats.

Building 'Conservation Intelligence': engaging communities in the work that we do

Dave Cade, Department of Conservation

David Cade has enjoyed the outdoors of New Zealand since he was old enough to accompany his Dad to the maimai on duckshooting opening day and on the riverbanks of the Taupo tributaries trout fishing. In 2007 he was approached by the Department of Conservation (DOC) and asked to be the public advocate for the CHECK CLEAN DRY campaign for didymo and other aquatic pests in the central North Island.

Christened 'Didymo Dave' early in the campaign, David travelled to Queenstown to see for himself the affect of didymo (*Didymosphenia geminata*) on rivers. Stunned by the devastation didymo had on the Hawea River, on the flight home he made a decision that he simply could not tolerate the thought of that same devastation in any other Aotearoa waterway. He also realised he was the underdog in a major environmental fight and very conscious of future generations to come. So to maximise his efficiency and results he threw the rule book out the window and in his mind went into battle with the Department of Combat. Developing a dream that motivated him, building his attitude, using examples where underdogs had won major battles and getting a group of supporters around him were some of the tactics he used and which he will cover. He will also speak on 'conservation intelligence', the huge cost that people with low levels of this intelligence are causing New Zealand, and projects he has developed to help with this problem.

Pest control: how do we know if the pressure is working?

Phil Cowan and Chris Jones, Landcare Research, Lincoln

In the on-going war of attrition between pests and those charged with reducing their impacts, how can we know if the tens of millions of dollars spent every year in New Zealand is actually making any difference? Despite this significant expenditure, there is little robust evidence that pest management programmes are effective in achieving their goals or that they represent good value to New Zealand. Indeed, there are few examples where the desired outcomes from pest management programmes are stated clearly enough for an assessment of whether they are being achieved at all. We present a case for a shift in the focus of monitoring in pest control programmes from "what we killed" to "the difference that we made." We describe a collaborative project with regional council biosecurity managers to provide councils with the capability to define pest management outcomes and monitor progress towards them and suggest a process by which community and other non-governmental pest control groups can show the differences that their efforts are making.

Field horsetail – from the Cretaceous to the Central Districts

Craig Davey, Horizons Regional Council

Craig has worked in the biosecurity field for nine years. He began this career as an Environmental Management Officer, Plants, for Horizons Regional Council, and his job was to outwork the Regional Pest Plant Management Strategy (RPPMS) to manage pest plant threats to native and productive environments. Craig also worked with landowners to protect significant habitats such as wetlands and bush blocks. He currently oversees the team of staff delivering the RPPMS to the Horizons region.

It has taken 100 plus million years to get here, and it ain't going away. Field horsetail is increasing its range in New Zealand and it is spreading by stealth. By the time field horsetail is discovered in new areas, eradication in usually not achievable. Field horsetail carries the label of one of the 10 worst weeds in the world. Horizons Regional Council has investigated management options for the field horsetail burden in their region which encompassed biological, chemical, social and pathway interventions. Field horsetail is spread widely by association with gravel, soil, and people. The impact this plant can have on productive land and also in wild areas can not be understated. Field horsetail will continue to spread if current practices continue, however its impact can be managed and the spread halted but intervention will take serious money and behaviour change.

Old Mans Beard in the Landscape – the pressure is ON!

Kay Griffiths, The Conservation Company and Ruth Fleeson, Horizons Regional Council

Kay has been passionate about conservation (and hence pests) since working with DSIR through the Conservation Corps in the early 90's, then with the Department of Conservation (DOC) as a ranger and programme manager. The last seven years of running The Conservation Company, with partner Craig, have been the most challenging and rewarding!

Many of us are struggling with the onslaught of Old Mans Beard (OMB) as this highly invasive weed becomes embedded in our landscape, and Regional Pest Management Strategies withdraw the battle lines.

What battles, if any, can be won?

We explore this issue through several case studies, looking at successful and failed efforts. What are the main themes behind those successes and failures, and what can we learn from them to ensure future endeavours are victorious

The biological control of tutsan (*Hypericum androsaemum*) in New Zealand

Hugh Gourlay, Landcare Research, Lincoln

Hugh has been working in the biological control of weeds for the past 30 years. He has been responsible for importing, host testing, rearing and releasing a wide range of biocontrol insects

for a large number of weeds in New Zealand. He manages the insect quarantine facility at Lincoln, and currently works on community projects looking at the potential for the biocontrol of tutsan, thistles, ragwort, old man's beard, banana passionfruit, broom, Japanese honeysuckle, and moth plant.

The cost of tutsan in the Ruapehu District, calculated from a 2010 survey of farmers, was estimated at around $1.2 million per annum while the loss in current land values could already be as high as $27 million. Tutsan is also found, and is of concern, in seven other regions throughout New Zealand (NZ). Tutsan now affects 150,000ha in the Ruapehu District threatening the economic sustainability of farms and forestry operations and degrading the conservation estate. Roadsides and river/stream margins are also affected and act as invasion corridors.

A natural enemy already known to attack tutsan in NZ and Australia will be studied further. Tutsan rust (*Melampsora hypericorum*) was first recorded in NZ in the early 1950s. It is not known how the rust got here and its impact in NZ is highly variable. The reason for this is not known and needs to be investigated. Tutsan is a polyploidy plant (has variable numbers of sets of chromosomes) and this could be the reason for variable rust impact.

Because there is no current suitable chemical control method and mechanical control is impracticable, biocontrol is the only long-term sustainable method of weed control - and is now the only possible means of slowing the spread of tutsan and reducing the impacts of this problematic weed.

Surveys of the introduced New Zealand and native range of tutsan will be made to detect insects and pathogens attacking plants as well as determinations of the rust and plant DNA. This paper will report on progress so far, as well as information about the effectiveness of the rust in NZ, Australia and Europe.

Wilding conifer management - a changing landscape.

Sherman Smith, Ministry for Primary Industries, Wellington

Sherman is a Senior Advisor in the National Coordination Preparedness & Partnership team of the Compliance and Response branch of the Ministry for Primary Industries (MPI). Sherman's work is focused largely around terrestrial pest animals, including helping to co-ordinate the Rabbit Co-ordination Group. His background is in ecology. He worked for some years with the Department of Conservation, based at Palmerston North and in the Western Ruahines. He then worked for Environment Southland as a Biosecurity Officer, Pest Animals, before moving to MAF in 2009.

MPI recently accepted a report on the current state of wilding conifer management in New Zealand. The report brings together existing knowledge, identifies issues and makes recommendations for improving management. It incorporates input from the New Zealand Wilding Conifer Management Group and a range of organisations involved in various aspects of wilding conifer management.

This presentation outlines some of the key findings raised in the report. One of the key proposals is that a non-statutory national strategy for wilding conifer management be developed. The next steps in seeking to improve collective management of wilding conifer are also discussed.

Detection of the Japanese pine sawyer beetle (*Monochamus alternatus*)

Emmanuel Yamoah, Travis Ashcroft and Diane Jones
Ministry for Primary Industries, Wellington

Emmanuel comes from Ghana. He completed his PhD at Lincoln University in Plant Pathology where he investigated the feasibility of using insects to carry a plant pathogen for biological control of gorse. Currently he is working with the Ministry for Primary Industries (MPI) and manages responses to incursions affecting plants and the environment.

The Japanese pine sawyer beetle (*Monochamus alternatus*) is a serious forest pest. It vectors the pinewood nematode (*Bursaphelenchus xylophilus*), a major forestry pest in Japan, China, Korea and Europe which causes pine wilt disease. This disease has destroyed large tracts of Asian pines and is recognised internationally as one of the most serious forestry diseases in the world. In light of this significant threat to New Zealand forestry, the Japanese pine sawyer beetle is classified as a Notifiable Organism under the Biosecurity Act.

MPI has completed a two year seasonal surveillance programme for Japanese pine sawyer beetle following detection of a single live adult beetle in a warehouse in Hamilton. No Japanese pine sawyer beetles were detected by the surveillance. Laboratory tests carried out on the beetle showed that it was not infected with the pinewood nematode.

Treatments applied to the warehouse where the beetle was detected and the results of the surveillance activities show that this incursion was a single hitch-hiker beetle and that there is no established population in New Zealand.

Overview of the New Nealand Fruit Fly Surveillance Programme and a review of the current science and strategies used

R. MacLellan[1] and D.G. Voice[2]
[1]Ministry for Primary Industries
[2]Plant Health and Environment Laboratory, Ministry for Primary Industries

Rory MacLellan is a Senior Advisor, Plants Surveillance Incursion and Investigation Rory joined Ministry of Primary Industries (MPI) in 2010 where he manages the gypsy moth and fruit fly surveillance programmes. He is originally from the east coast of Canada were he worked in biosecurity with the Canadian Food Inspection Agency (CFIA) in various commodities for nine years including potatoes, fertilizer and forestry. His roles have included managing national forestry programs such as gypsy moth, Dutch elm Disease and christmas tree exports. He studied at the Nova Scotia Agricultural College and he has farming experience in dairy, beef, grains and potatoes, maintaining an active interest in the agriculture community.

The New Zealand Fruit Fly Surveillance Programme was initiated by the Ministry of Agriculture and Forestry (MAF) in the mid-1970's to provide assurance of country freedom from economically important fruit flies, and as an early warning detection of fruit fly incursions to facilitate eradication. Approximately 7500 Lynfield traps are set up and maintained from September to June of each year. There are currently about a hundred species of fruit fly listed on the MAF Biosecurity New Zealand (MAFBNZ) website as regulated organisms.

The absence of economically important fruit flies in New Zealand enables fresh produce to be exported without the need for fruit fly treatments, thus facilitating trade. It also enables crops susceptible to fruit fly to be grown here without the need to manage fly populations and the associated damage that they cause. As an illustration of how important this is, produce exports in 2008 earned $1.8 billion, and more than 90% of fresh fruit and vegetable exports by value were of species that are considered hosts for fruit flies (Horticulture New Zealand, 2007).

The New Zealand Fruit Fly Surveillance Programme has not been reviewed since 1989 and some aspects of the programme have changed over the years without detailed reasoning and a consistent approach. Currently there is no effective way to measure the programme objectively. To this effect the programme is currently under review by MPI in cooperation with a technical advisory group to address these issues. This will also allow for new information and technology that is available to be incorporated into the programme. The purpose and overview of the current New Zealand Fruit Fly surveillance programme as well as the purpose and aim of the review and status of projects within the review will be discussed.

Landscaping & termites - the 'quiet sleeper'

Shaun Bennett, Ministry for Primary Industries, Auckland

Shaun is currently a Scientist (Entomology) with the Plant Health and Environmental Laboratory, Ministry for Primary Industries (MPI) in Auckland. He joined the laboratory in 2001 as a Senior Technician after completing his Masters studies at Massey University. His current role with the laboratory is primarily focused on diagnostics of exotic, intercepted, and local invertebrates - that is, trying his best to put a name to the bugs that all sorts of people find in all sorts of places. The other core areas of Shaun's work involve responding to exotic organisms, surveillance for targeted organisms (e.g. fruit fly), validating new-to-New Zealand organism records, and dealing with enquiries from the general public.

MPI's Plant Health & Environment Laboratory (PHEL) provides diagnostic testing and technical expertise for new pests and diseases affecting plants and the environment in the disciplines of entomology, virology, bacteriology and mycology. The main activities and role of the laboratory will be presented, and recent work against exotic termites in New Zealand will be discussed as an example of the laboratory's work in diagnosis, providing technical advice during incursions, and control of exotic pests.

Control options for Argentine and Darwin ants

Melissa Mathieson, NZBI Study Award Recipient

Melissa completed a BSC and PGDip Sci at Canterbury University. After a few interesting years of summer work at Tasman District Council doing ant monitoring, she then undertook a Masters thesis on invasive pest ants. Melissa is now working at Hill Labs in Christchurch and is hoping to do some more research on the environment and animals and also to venture out overseas in search of job diversity and adventure.

By determining if there is any temporal variation in toxic bait, carbohydrate and protein preference in Argentine and Darwin's ants, we can provide better control options because

we can identify with more accuracy when ants will be foraging for one food type over another. Improving our understanding is also fundamental as we can improve future bait formulations, bait application and timing, and increase levels of bait uptake.

I had two aims in this thesis. First, I investigated toxic bait, carbohydrate and protein preferences for Argentine ants (*Linepithema humile*) and Darwin's ant (*Doleromyrma darwiniana*). The second aim in my thesis was to examine the efficacy of toxic baits in laboratory colonies of Argentine ants. Food preferences varied between species and within species considerably throughout the year, although Darwin's ants consistently favoured foods higher in carbohydrates. Argentine ants showed a significant preference for protein over carbohydrates during December and January.

Despite differences in carbohydrate and protein preferences the preference for individual toxic baits showed little temporal variation. The toxic bait efficacy experiment revealed that Xstinguish™ and Exterm-an-Ant® baits produced the highest mortality rate. Other commercially available toxic baits had little effect on workers or queens. The efficacy of the toxic baits was influenced by the starvation level of the ant colonies, and only the colonies that were starved for 48 hours experienced a 100% mortality rate. Due to these results, I recommend that bait application with Xstinguish™ and Exterm-an-Ant® in late winter-spring would be optimal as this time frame is when ants are likely to be starved, and when foraging activity is increasing, thus maximising the chances of bait uptake. A second round of baiting treatment with both baits (Xstinguish™ and Exterm-an-Ant®) in summer when Argentine ants have been shown to undergo a second wave of reproduction could also be beneficial.

Assessing the sensitivity of interference based monitoring devices to possum presence

Matt Kavermann[1], Dr. James Ross[1], Dr. Adrian Paterson[1] and Dr Grant Harper[2]
[1]Centre for Wildlife Management and Conservation, Lincoln University
[2]Department of Conservation, St Arnuard

Matt Kavermann is a PhD candidate in the Centre for Wildlife Management and Conservation at Lincoln University. This is his final year of his studies which have focussed on the use of bio-acoustics for manipulating pest animal behaviour and improving vertebrate pest control operations.

Surveying and identifying possum presence at sites with low to very low possum densities (and subsequently removing those remaining individuals) requires highly sensitive monitoring tools. The development and implementation of small, relatively inexpensive and light weight interference based monitoring devices, such as WaxTags and peanut butter lured Chew Cards, have greatly increased the sensitivity of possum surveys over standard leg-hold trapping. While anecdotal evidence from contractors suggests that Chew Cards are more sensitive to possum presence than WaxTags, little empirical evidence is available comparing the sensitivity of the two methods.

Research presented here outlines recent preliminary trials comparing the sensitivity of un-lured WaxTags and Chew Cards at Nelson Lakes National Park, an area of beech forest with a low density possum population. Preliminary results show that Chew Cards were significantly more likely to record possum interference than WaxTags with 58% (7/12) of Chew Cards recording possum interference compared with only 8% (1/12) of WaxTags. Result suggest that Chew

Cards are more sensitive to possum interference than WaxTags which may be attributed to the olfactory lure (peanut butter) contained within the Chew Card stimulating greater possum interaction. Replicate trials with larger sample sizes are currently underway to validate these preliminary findings.

Non-target monitoring following aerial 1080 possum control in the Hauhungaroa Ranges 2011

Grant Morriss[1], Graham Nugent[1] and Neil Fitzgerald[2]
[1]Landcare Research, Lincoln
[2]Landcare Research, Hamilton

Grant is a senior technician with Landcare Research and has been involved in Pest Control Research and Wildlife Ecology for the last 20 years.

To determine non-target effects of pre-fed aerial 1080 possum control on birds and deer we compared native bird activity (calls and sightings) on six blocks before and after poison application and two untreated blocks and wild red deer by-kill on blocks baited with and without deer repellent. Two aerial 1080 baiting techniques (aggregated (strip) and broadcast sowing) were compared, with strip sowing applied at two different flight-path spacings, with and without Epro deer repellent (EDR) (i.e. six treatments).

In each block (n = 6) 135–182 five-minute bird counts were completed before and after 1080 poisoning, with non-treatment blocks (n = 2) counted at similar times. Some substantial changes – mostly declines, but also some increases – occurred between counts in treatment blocks, but these occurred equally in non-treatment blocks, indicating no major effects on birds as a result of pre-fed 1080 poisoning. During 248 field-days expended on bird and other monitoring, only 11 birds were found dead after the 1080 baiting (six blackbirds, four kererū and one fantail). As a broad approximation, this would equate to one dead bird per square kilometre of area searched, whereas the counts would suggest some hundreds of living birds per square kilometre. None of the kererū or the fantail contained 1080 residues, but five of the six blackbirds did. Two of the kererū showed obvious signs of predation.

At two 125-ha sites within each of four blocks (two in which EDR bait was used and two treated with non-EDR bait), we conducted systematic searches for deer carcasses after the 1080 baiting. No deer carcasses were found in the two EDR blocks, compared with 15 in the non-EDR blocks. A further 27 deer carcasses were found in the course of other work, all in blocks where non-EDR bait was used. Of the total of 42 carcasses found, 36 were analysed for 1080 residues, with all but one being positive.

The results suggest that EDR substantially reduced deer by-kill and that few if any native birds were killed as a result of any of the pre-fed 1080 baiting treatments.

Using less 1080 in aerial baiting: cluster- and strip-sowing update

Grant Morriss, Bruce Warburton and Graham Nugent
Landcare Research, Lincoln

In 2011, building on previous research, we conducted two trials comparing conventional broadcast sowing of 1080 baits for possum and rat control with new approaches in which the bait was sown in strips or clusters and at lower rates than usual. We used both tracking tunnel indices (TTI) and Chew Card indices (CCI) to compare the relative reductions in possum and rat abundance achieved during: (1) a largely possum/TB-focused operation in the Hauhungaroa Ranges using prefed broadcast 1080 baiting at 1.5–2.0 kg/ha over 51 000 ha, and a range of experimental prefed strip-sowing options by helicopter delivering 0.45–1.00 kg/ha over 20 200 ha; and (2) a conservation-focused operation in Whanganui National Park in which broadcast- and cluster-sowing techniques by helicopter were compared with each other and with strip sowing using a low-cost fixed-wing aircraft.

In the Hauhungaroa operation, eight sowing treatments (two broadcast, six strip) were compared. For possums, CCIs varied widely before control (range 2.5–47.5%), but in all but one block were below 10% afterward. Overall, strip sowing appears to have been less consistently effective than broadcast sowing. High strip-sowing efficacy was achieved in one of the blocks where pre-control possum numbers were already low, yet also in the block where they were highest. For rats, CCIs again varied widely before control but not as markedly as for possums (range 23.1–78.6%). Again, the post-control CCIs for rats were all low (<7%) with one exception. Although the block in which the rat reduction was poor was not the block in which the possum reduction was poor, both were strip-sowing treatments in which a wide (150 m) flight-path spacing was used. In line with that, the relative reductions in rat TTIs and CCIs were all high, but with the lowest estimates also being for the treatments using 150-m flight-path spacing.

In the Whanganui National Park operation, two broadcast, four cluster and two strip treatments were compared. All of these were prefed. Overall the reductions in possum CCIs were generally poor (range 34.3–62.5%), but with no evidence of any substantial difference between baiting treatments. That suggests that some factor unrelated to sowing method had resulted in generally greater than expected possum survival. That appears to be unrelated to bait quality, as high reductions in rat CCIs and TTIs were obtained regardless of treatment (ranges 95.7–100% and 98.6–100% respectively).

Overall, the results add to previous work indicating that aggregating baiting (i.e. using strip or cluster sowing) is usually, but not always, as effective as broadcast baiting. Based on these two trials, 150-m flight-path spacings would not be recommended for strip sowing 1080 bait. Further trials will focus on improving the consistency of these new methods.

Pindone residues in rabbits

Penny Fisher, Samantha Brown and Jane Arrow
Landcare Research, Lincoln

Penny is a research leader in the Wildlife Ecology and Management team at Landcare Research – her main research focus is on pesticide toxicology, bait and toxin technology and animal welfare in pest management.

Landcare Research has recently completed assessments of the residual concentrations of pindone in the tissues of poisoned rabbits. This is important information for determining secondary risk to predatory and scavenging wildlife, especially because pindone use is expected to substantially increase over the next few years with the declining efficacy of rabbit haemorrhagic disease (RHD) and ongoing pressure on the aerial use of 1080 for pest

(rabbit) control. Characterising the relationship between pindone intake and resultant residue concentrations in poisoned rabbits will also help to optimise the minimum amounts of pindone bait needed for effective rabbit control while reducing the risk to non target wildlife as far as possible. Our research measured the residual concentrations of pindone in the muscle, fat and liver of laboratory rabbits that were offered acute (single feed), chronic (multiple feed) and maximum (free feed) lethal doses of pindone cereal baits. These results were compared with residue concentrations measured in rabbit carcasses collected from the field following three pindone baiting operations. Initial analysis demonstrated that rabbits collected from the field had higher pindone residue concentrations than the laboratory rabbits. This suggests there may be scope for reducing the amount of pindone needed to achieve effective rabbit control, which in turn potentially reduces the residual concentrations of pindone available to scavengers of rabbit carcasses.

Powering up weed workshops

Sara Brill, Northland Regional Council

After working for five years at Bay of Plenty Regional Council as a pest plant officer, grandchildren drew her north two years ago. She is now working at Northland Regional Council as a biosecuirty officer. Sara is keen to promote the weed message to the public and empowering people to get involved. She also enjoys learning about the many other facets of biosecurity including freshwater, marine and animals.

A series of three-hour public weed workshops, first run in Tauraunga, and more recently in Northland have demonstrated that there is a growing demand for up to date weed information and tips for control. The workshop programme has been refined over time and tailored to meet a broad customer base from retired home gardeners, through to experienced contractors. The first workshops in Northland in 2011 had over 200 people attend and feedback was very positive. Evidence of uptake of the learnings has been demonstrated by the increase in the number of people registering as Weedbuster groups or individuals in Northland. Participants could opt to receive further information from Weedbusters and this was taken up by more than half the attendees.

Hauraki Gulf Island Biosecurity - an assessment of ferry passenger awareness

Lydia Tyrrell[1], Jeff Cook[2], Nick Waipara[2], Diane Fraser[1]
[1]Department of Natural Sciences, Unitec Institute of Technology
[2]Biosecurity, Environmental Services Unit, Auckland Council

Lydia Tyrrell is currently in her final year of study towards a Bachelor of Applied Science majoring in Biodiversity Management at Unitec in Auckland. After working in garden centres for five years Lydia had obtained sufficient knowledge and experience to start her own garden maintenance business, which quickly became successful, but did not fulfil her desire to preserve natural beauty for future generations to enjoy. In 2009 she decided to halve her workload and begin part time study at Unitec, which went surprisingly well and encouraged her to go full time in 2011 to complete her degree more quickly. She still enjoys working as a gardener to support herself through her studies.

The islands of the Hauraki Gulf are highly vulnerable to infestation and reinfestation by invasive alien animals and plants due to high numbers of human visitors and residents. Islands of the Hauraki Gulf range from pest free natural ecosystems to highly urbanised, horticultural and agricultural environments. Pathways of invasion include ferry passengers and freight, to and from Auckland City and other islands in the Hauraki Gulf, as well as private vessels landing without restriction on most of the islands - all of which pose a biosecurity risk.

A survey was conducted during January and February 2012 to determine high risk pathways of invasive species and establish the awareness of ferry passengers in regards to biosecurity issues concerning the islands of the Hauraki Gulf. Over 600 questionnaires were completed on freight, vehicle, and passenger-only ferry trips to and from the mainland and six Hauraki Gulf islands. Questions were asked regarding the frequency and purpose of trips to the islands, perceptions of biosecurity risks and participant awareness of ways of minimizing these risks. The information gathered has the potential to help to identify pathways/vectors of high biosecurity risk and assist to improve the efficacy of Auckland Council's "Treasure Islands" campaign by targeting pathways of high risk of invasion.

Counteracting pseudoscience, scuttlebutt, and scaremongering in the 1080 debate

Alan Dicks, Animal Health Board, Wellington

Al Dicks is a Communications Advisor at the Animal Health Board in Wellington. A key part of Al's role is to ensure the public have access to factual information about how and why the AHB carries out pest control, including the use of toxins.

The Animal Health Board (AHB) manages a world-leading bovine TB control programme. The use of toxins, including aerially-dispersed biodegradable 1080, is critical to the continued success of this programme as disease-carrying possums are the main cause of new herd infections in at-risk areas.

AHB communications advisor Alan Dicks discusses why both credible science and sharing positive experience are essential to counteracting pseudoscience and scuttlebutt, and looks at some of the strategies the AHB and other agencies are using to engage the public in informed debate.

Kauri Dieback - an emerging biosecurity threat to New Zealand's iconic kauri forests

Dr Nick Waipara et al, Biosecurity, Auckland Council, and Ian Mitchell, Department of Conservation

Kauri ill-thrift, commonly known as kauri dieback, has been identified as an increasing problem affecting kauri (*Agathis australis*) across the Auckland and Northland regions. A water and soilborne pathogen, *Phytophthora taxon Agathis* (PTA), has been identified as the causal agent of kauri dieback at an increasing number of locations, particularly within the Auckland and Northland regions.

This disease potentially poses a threat to kauri, both at the individual icon level and at the population level, with flow-on effects to kauri ecosystems. An interagency national response was therefore initiated in 2008 to manage the disease. A national surveillance and tree health survey are now underway to determine the extent and damage of the disease to iconic kauri forests. Risk management of the potential primary vectors of the disease, including people and feral pigs, is ongoing. Recent progress of the disease management programme will be presented.

Pouto dune lakes - what makes them special and how we are managing them

Jillian Fulcher, Northland Regional Council

Jillian is a Biosecurity Officer (Aquatics) at Northland Regional Council. Her work involves investigations and reporting of aquatic (marine and freshwater) threats under the Regional Pest Management Strategy (RPMS). Jillian has been working for the Northland Regional Council for 15 months, after working in the UK and France in the field of environmental education for freshwater fisheries.

Northland has over 400 freshwater lakes, many of which are coastal dune lakes. Coastal dunes are dynamic systems which change constantly. In high rainfall areas, sand holds a great deal of water and dune lakes form in hollows, between parallel dunes and as a result of blocked water courses. As the dunes age and stabilise these lakes may persist to form perched dune lakes whilst smaller shallower ones eventually infill to form wetlands with little open water. Coastal dune lakes are regarded as globally imperilled because many are severely impacted by development and invasive weeds.

Ecological monitoring is carried out for 17 dune lakes on the Pouto Peninsular, Kaipara, nine of which are ranked as outstanding or high value. These lakes provide habitat for native waterfowl, fish, invertebrates and a wide range of submerged and lake edge plants. However not all are in good health. Many have problems caused by increases in nutrient level, stock access, invasive weeds, lake use and land development. This paper provides information about weed eradication projects currently in progress, using grass carp and the herbicide Endothall. Development of a Northland lakes management strategy aims to ensure that future management actions are less reactive. The lakes management strategy provides better understanding of the value and functioning of Northland lakes, and the threats facing them, and will assist with prioritisation of the lakes and recommended management actions.

A national HSNO approval for spraying in aquatic environments

James Bevan[1] (MNZPI), Angus McKenzie[2] (MNZPI, RPTI)

[1]Director, Latitude Planning Services Ltd
[2] Principle Planner, Latitude Planning Services Ltd

James Bevan is a Principal Planner and Director of Latitude Planning Services Ltd. He is a member of the NZ Planning Institute and an independent commissioner with a professional interest in shared services and collaborative planning between local authorities. James has been involved in a range of comprehensive resource consents for stormwater, flood

control and herbicide spraying, and his topic explores the collaboration by 12 partners on an application to permit the use of certain chemical sprays over water, and highlights opportunities for further collaboration in the Biosecurity sector.

Latitude Planning Services (LPS) in conjunction with the National Institute of Water and Atmospheric Research (NIWA) have lodged a national application to the Environmental Protection Agency (EPA) to enable the use of metsulfuron, haloxyfop, imazapyr and triclopyr over water for the selective control of aquatic pest plants. This application has been lodged on behalf of 15 parties including 10 regional councils, the Department of Conservation, MAF and Mighty River Power.

This national application builds upon the approach taken to registering endothall in 2005, and will provide the applicants with a set of additional tools to manage and eradicate pest plants in fresh water and coastal environments.

This paper will describe how the national application achieves strategic biosecurity outcomes, and will explore further opportunities for greater collaboration in biosecurity management and operations, including:

1. Comprehensive resource consent processes
2. Regional plan advocacy and leadership
3. Collaborative contracting models for pest plant management

Joint-agency response to Undaria pinnatifida in the Fiordland Marine Area - two years on…..

Jennie Brunton, Ministry for Primary Industries, Wellington

Jennie specialises in marine pest responses and marine pest risk prevention work. Her main role is working with other agencies and key stakeholders to protect the Fiordland Marine Area from marine pests including the current joint-agency response that is aiming to locally eliminate the marine pest seaweed undaria from a remote area of Fiordland.

Fiordland's marine environment is an international treasure with unique but fragile marine ecosystems. It is vital this area is protected from the impacts of introduced marine risk organisms.

In April 2010, a single specimen of *Undaria pinnatifida* (undaria) was found growing on a barge mooring rope in Sunday Cove, Breaksea Sound, Fiordland during an annual surveillance exercise. Undaria is widespread throughout New Zealand however this was the first detection of undaria in the Fiordland Marine Area. As a result, a joint-agency response team was formed, consisting of Environment Southland (lead agency), MAF and DOC.

Local elimination of undaria from Sunday Cove and pathway controls to prevent re-invasion is the preferred response option. Since July 2010 regular monitoring of Sunday Cove has occurred with all plants found being removed, and specific treatments have been applied in the area. This is the first joint-agency response to a marine pest in this unique marine environment and has been ongoing for two years now. Further work is also being done to educate boat owners about good maintenance and hull cleaning to prevent further marine pests reaching Fiordland.

What to do about marine pests - a regional council perspective

Gail Townsend, Jillian Fulcher and Don Mckenzie
Northland Regional Council

Gail has worked as a biosecurity officer for Northland Regional Council for the past four years. Her role includes marine and freshwater biosecurity, RPMS reviews and implementation. Prior to this Gail worked for the Ministry of Fisheries in Wellington for 10 years, in both the scientific observer programme and the research data management group.

The Pest Management National Plan of Action makes it clear that regional councils have a role to play in marine biosecurity, but it can be difficult to know where to start. Northland has recently adopted a marine pest management strategy, which aims to reduce the risk of marine pests establishing and spreading in Northland, and raise public awareness of marine pests and their impacts. A preliminary regional surveillance plan has been developed which identifies species of concern, pathways and vectors relating to the spread of pests in Northland. The plan identifies opportunities for increasing both passive and active surveillance in the region.

Key elements of implementing the pest management strategy and surveillance plan include, raising public awareness of marine pests and working with partners. Working with partners enables the council to not only increase surveillance activities but be better equipped for response planning.

A series of free public marine pest workshops were held during 2011 in partnership with MAF Biosecurity, and marine pests are regularly featured in local events and publications. Initiatives are currently underway to engage the local marine industry and communities in surveillance and response planning and action. Community involvement creates a connection to the problem and enables both passive and active surveillance to take place over a greater area. Key factors for success are described along with valuable lessons on what to avoid and ideas for the future.

Proving TB freedom in North Canterbury.

Andrew Gormley[1], Graham Nugent[1], Pen Holland[1], Dean Anderson[1], Mandy Barron[1], Kevin Crews[2]
[1]Landcare Research, Lincoln
[2]Animal Health Board, Christchurch

Mandy Barron is a quantitative ecologist in the Wildlife Ecology and Management Team at Landcare Research in Lincoln. Her work involves modelling vertebrate pest populations and diseases within these populations such as bovine tuberculosis in brushtail possums.

The management of bovine tuberculosis (TB) in livestock and wildlife has been highly successful, with the number of TB-infected cattle herds having plummeted by 97% since 1994, to just 60 herds in February 2012. It is now likely, but as yet mostly unproven, that TB is now absent from many previously infected areas. The emphasis on TB-related management of wildlife is therefore shifting rapidly from simply controlling possums to combining control with surveillance aimed at ‘proving’ Tb freedom.

We have developed a framework that utilises information from herd testing, sentinel animals and possum detection and trapping to determine the probability that an area is free of TB. We present the results from the eight Vector Control Zones (VCZ) in North Canterbury that are currently in the Eradication Phase of control for TB. These areas are across diverse landscapes such as developed farmland (beef/dairy/deer) and forested areas (native and pine).

We also explore ways of how to determine the optimal mix of further control (particularly of possums, the main wildlife host) and disease surveillance, and examine the complex trade-offs between expenditure on control and surveillance. A very simple illustration of the outcomes is that for one of the VCZs (Ashely Forest), the amount of surveillance now required to declare TB freedom could be achieved by 70 pigs, or 3,200 possum trap-nights.

Overall, we aim to determine the optimal allocation of resources (i.e. dollars) between further control (particularly of possums, the main wildlife host) and disease surveillance. We examine the trade-off between expenditure on wildlife control and surveillance, looking for the quickest route to TB freedom, with no expense spared, and the cheapest route to TB freedom, given a restricted annual budget.

Lures to monitor and control vertebrate pests at low densities: sex pheromone attractants

Janine Duckworth and Jane Arrow
Wildlife Ecology and Management, Landcare Research, New Zealand

Janine Duckworth is based at Landcare Research in Lincoln and specialises in the reproductive biology, immunology and biological control of wildlife pests. She has a PhD in Animal Science and is currently researching alternative methods of pest control for vertebrate species in NZ including fertility control of possums and rats, RHDV biocontrol of rabbits and the development of pheromone lures for the improved detection and control of stoats and possums.

Solitary species, such as possums and stoats, are highly effective at finding suitable mates using sex pheromone cues, even at very low population densities,. Such cues can be used as attractants to lure animals to desired locations as was recently demonstrated using bedding material to successfully trap difficult-to-catch stoats on Kapiti Island. Scent lures containing anal gland secretions or urine from either male or female possums, ferrets or stoats have been shown to be attractive to both sexes (Clapperton et al 1999; Morgan et al. 1995; Spurr et al 2004) but no one has looked at the effect of reproductive state on attractiveness of secretions and the ability of sex pheromones to increase encounter and interaction rates with traps or monitoring devices. In a pilot study, we confirmed the attractiveness of secretions collected from female possums at the height of oestrus (sexual attractiveness), compared with samples from male possums, non-breeding females and control lures, by recording how quickly captive male and female possums found each preparation and the number and duration of investigations. In the longer term, sourcing sufficient biologically-derived active ingredients (bedding materials, urine or anal gland secretions) could limit the use of such lures for pest control. We will use GC-MS technologies to identify the attractive volatile components of the pheromone profiles from oestrous and non-oestrous females and then test synthetic versions of potent compounds as sex attractant lures to improve the efficacy of monitoring and control operations for stoats and possum in the field.

Monitor & Manage the Marsupial Menace - computer games for learning the pest management decision making process

Pen Holland[1], Hazel Bradshaw[2], Julian Looser[2] & Bruce Warburton[1]
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Bruce Warburton is a senior scientist and programme leader with Landcare Research, based at Lincoln, and his research is focussed on developing improved methods and strategies for managing vertebrate pests in New Zealand.

Invasive mammals such as possums, rodents and deer are widely controlled across New Zealand to conserve native biodiversity, protect production values, and limit disease spread. However, the way in which control is implemented can be highly controversial, and many of the issues can only be resolved by discussion among multiple stakeholders with conflicting values regarding why control may be necessary, what the end goal should be, and what control measures should be used to attain that goal. Good communication of scientific research is therefore vital to ensure that stakeholders are well-informed about pest impacts, and about the ecological and economic consequences of the available management strategies.

We have integrated models of flora and fauna interactions and dynamics, monitoring, and management and economics, to create a virtual world in which to test possum management strategies. This has been embedded within a computer game, to provide a novel medium by which to engage non-scientists and/or non-specialists with the science behind possum management. The learning goal of the game is for players to appreciate how complex forest management can be, battling with constrained resources, conflicting values of multiple stakeholders, and a multitude of ecological interactions. The game will be released over the internet, and players' strategies tracked through time, to discover 1) how strategies change over time, as problems get larger and more complex, and 2) whether anyone can find novel or alternative solutions for managing specific areas. By playing the game, users will become better informed of the economic and ecological consequences of their actions, enabling them to support or participate in the development of pest management plans in their communities in an informed way.

Refining operational practices for controlling rabbits on agricultural lands

A. David M. Latham, Graham Nugent, and Bruce Warburton
Landcare Research, Lincoln

Reduced effectiveness of rabbit haemorrhagic disease (RHD) has resulted in increased rabbit numbers and adverse effects on farm stocking rates and environmental and conservation values. This has resulted in the need to reinstate widespread primary control of rabbits, commonly using aerially-applied sodium fluoroacetate (compound 1080) bait. However, this method is hugely expensive, often costing $75–$100 per ha. That high cost reflects the high sowing rates applied to overcome shortcomings in carrot bait quality, i.e., highly variable bait size and toxicity. We have developed (and tested a subset of) improved baiting techniques that reduce the amount of bait (and 1080) used in aerial rabbit control. Preliminary results show that reduced sowing rates can half per-ha costs of control. We aim to test further experimental treatments in late-winter 2012, and aim to achieve >75% reduction in costs. Such reductions will enable some farms in rabbit-prone areas to remain economically viable, and others to increase profitability.

Day 2 Thursday 19 July 2012

Problems and solutions to invasive species – the Kruger experience

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Kruger National Park (KNP) was established in 1898, and covers an area of 20,000 km^2. The first six alien plants were recorded as 'troublesome weeds' in KNP in 1937. This number has expanded to about 350 alien plants and 50 animals today. Concerns were first raised in the mid-1920s, however little was done to mitigate the threat of invasion from neighbouring areas or prevent the introduction of ornamental plant species. With the revision of the KNP management plan, a threat analysis of each of the parks biodiversity and ecosystem attributes elevated the threats posed by invasive alien species to a higher level of concern.

As part of the revision of the management plan KNP more formally adopted an adaptive management approach, within which invasive species management and monitoring also began to be implemented. Thresholds of Potential Concern (TPC) were developed to provide a way of managing complex, dynamic ecosystems, by providing thresholds within which varying levels of change may be monitored.

The invasive species TPCs focus on 1) the introduction of new species, 2) range expansion, and 3) an increase in density (leading to negative impacts on biodiversity). Should these thresholds be breached, the reasons and possible management options are explored and a suitable management action initiated. During the implementation phase continuous monitoring provides feedback to a science-management forum to determine progress and revise the management action if needed. Some of the most widespread and problematic species include an aquatic snail (*Tarebia granifera*), *Opuntia stricta* (Australian pest pear), *Eichhornia crassipes* (water hyacinth), *Chromolaena odorata* (triffid weed), *Lantana camara* (lantana) and *Parthenium hysterophorus* (parthenium). While progress has been made with the management of *Opuntia stricta* through the use of biocontrol agents, species such as *Chromolaena odorata* require vigilance and follow-up control, while *Parthenium hysterophorus* is rapidly invading the park and significant efforts are needed if its spread is to be contained.

From pets to pests – assessing the biosecurity risks within the pet trade

Jaap Knegtmans, Ministry for Primary Industries, Wellington

Jaap is Senior Adviser Conservation with the Ministry for Primary Industries. His primary role is to provide oversight on conservation and biodiversity values across the biosecurity business. He has 16 years experience in a range of pest management and environmental management roles; and has led a number of stakeholder initiatives in this field.

Almost three quarters of New Zealand homes have a pet. While Pets are highly valued by society, pet escapes and deliberate releases are a source of invasive species. In New Zealand strict controls apply to new introductions of pet species from overseas but of the 1500+ pet species currently in New Zealand there are limited barriers to their possession or trade. There is an imperfect understanding regarding the legal status of these pets and the risks they pose. The National Pet Biosecurity Project is a partnering initiative, involving industry and biosecurity agencies, tasked with addressing key knowledge gaps and identifying enduring ways to mitigate the biosecurity risks posed by pets. The aim and objectives of the project and initial results are discussed.

A herbicide spraying system to control wilding conifers in New Zealand

Peter Raal[1] and Stefan Gous[2]
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[2]Scion, Rotorua

Pete is a Technical Advisor, Threats, working out of the Otago Conservancy Office as a distributed member of the Department of Conservation's Christchurch Service Centre's Threats Unit in the Science and Technical unit.

The work that he does includes specialist weed control, strategising and operational planning advice, technical support for the planning, monitoring, reporting and reviewing of weed control programmes according to standard operating procedures (SOP) requirements, provision of expert advice for aerial agrichemical application, and design, implementation and monitoring of specialist herbicide trials for difficult to control ecological weeds.

The literature contains little information on ground or aerially applied herbicide efficacy to control wilding conifers in New Zealand. Numerous study sites throughout the country have been selected to conduct ground-based basal bark, aerial spot spraying and boom spraying herbicide trials on invasive wilding conifers in New Zealand. These trials are being conducted as a collaborative venture between Scion and the Department of Conservation.

The ground-based basal bark and aerial spot treatment trials are designed to control sparse, isolated and/or scattered wilding conifers. These wildings are a major concern, as they increase the point of invasion once they seed. These methodologies provide a mechanism whereby these trees can be relatively quickly and cost-effectively controlled before they seed.

The boom spraying trials are designed to control dense infestations of wilding conifers. A randomised complete block design with five herbicide treatments was aerially applied by calibrated helicopter. Treatments were applied using a boom spraying system at 400 litres per ha during January 2011. The initial evaluation was conducted at 12 months after treatment. A final assessment will be done after 24 months. Reduction of the number of live woody stems per hectare was used as the measure of efficacy and control. Initial results are very promising, tree mortality varied from 75% for the least successful treatment to more than 90% mortality for the best treatment. Because the systemic herbicides used are only effective during the active growing season, it is anticipated that the death rate might still increase after the second growing season.

The preliminary results of all of these experiments and implications for the future management of wilding conifer infestation will be discussed.

Demonstrating cause and effect in weed biocontrol: St. John's wort (*Hypericum perforatum*) as a case study

Ronny Groenteman[1], Simon V. Fowler[1] and Jon J. Sullivan[2]
[1]Landcare Research, Lincoln
[2]Bio-Protection Research Centre, Lincoln University

Ronny joined Landcare Research in 2008 to work on classical biological control of weeds. Currently her main research looks at target and non-target effects in the successful biocontrol of St. John's wort.

To biocontrol practitioners and land managers who have reaped the benefits already, biocontrol is a no-brainer. But many others will remain sceptical about biocontrol, until more proof can be provided that biocontrol really can slow or reverse plant invasions. We identified the successful biocontrol programme against St. John's wort (*Hypericum perforatum*) in NZ as a suitable system to demonstrate a direct cause and effect relationship between the activity of biocontrol agents and population growth (or decline) of the host weed. We found a remnant population of the weed, hosting well established populations of the biocontrol agents (lesser and greater St. John's wort beetles, *Chrysolina hyperici* and *C. quadrigemina*) and, over the past two years, treated parts of the population with insecticide to exclude the biocontrol agents. The experiment is on-going (well into its third season now), and preliminary results will be presented. More importantly, I will discuss the approach we took in preparation to address potential criticism from 'biocontrol sceptics' and how the experiment evolved to accommodate these needs.

Geothermal habitats in New Zealand and threats to their biodiversity values

Sarah Beadel, Chris Bycroft, William Shaw
Wildland Consultants Ltd, Rotorua

Sarah is a very experienced botanist and ecologist, having worked as a consultant since 1985 when she established Wildlands Consultants. She has experience throughout New Zealand in vegetation monitoring, survey and mapping, identification of management issues and options for natural areas, restoration planning, evaluation of areas for nature conservation value, threatened species and weed survey and monitoring. Sarah has worked on many ecological surveys of indigenous vegetation and habitats to assess ecological values and identify management requirements, including detailed field surveys of the vegetation of Tauranga and Ōhiwa Harbours, and geothermal areas in the central North Island. She has been project leader for over 15 Protected Natural Area Programme (PNAP) surveys. Sarah is passionate about indigenous plants and ecological restoration.

Geothermal vegetation - influenced by surface expressions of heat from the Earth's interior - is naturally rare in New Zealand, and internationally. The varied nature of geothermal manifestations, due to varying combinations of temperature, chemistry, hydrology, and localised protection from frosts, produces rare and unusual habitats for plants. These include habitats for threatened and naturally rare plant species, as well as species occurring outside 'normal' latitudinal ranges. The extent of geothermal vegetation has been significantly reduced and is still threatened by exploitation for energy production (thermal and hydro-electricity, heating, and industrial uses), land use changes such as mining, farming, forestry, urban development, tourism, fire and pest plant invasion. Invasion of pest plants, particularly introduced conifers

and other woody plants, is a major threat at many sites. Examples of weed invasion in geothermal sites will be shown, along with progress of some ecological restoration projects. Restoration management of key ecological threats is now a priority for the maintenance of ecological values at many geothermal sites. Priorities for restoration management of geothermal sites in the Waikato Region have been identified based on key ecological values (e.g. diversity of habitat types present and presence of threatened species), and ecological threats (wilding pines, other pest plants, and pest animal threats).

Biodiversity and Biosecurity – a hydro-generator's perspective

Cam Speedy, Genesis Energy

Cam is an Ecologist in the Renewable Energy Environmental Team at Genesis Energy with responsibilities across the Tongariro, Waikaremoana and Tekapo Hydro Power Schemes. He spent 15 years managing biodiversity for the Department of Conservation in the Tongariro region and has worked in the private and corporate sectors for over ten years. He is a current member of the Tongariro Conservation Board and runs a private Wildlife Management Consultancy outside of his role at Genesis Energy.

As a user of natural resources, Genesis Energy has both legal and moral obligations to operate its generation assets in an environmentally responsible way, including managing its effects on indigenous biodiversity. Adverse effects of Genesis Energy's generation activities are managed via a suite of carefully applied resource consents; via close relationships with key stakeholders; and through strong company values. Genesis Energy must also consider a wide range of biosecurity risks that can impact both its operations and on important biodiversity values at its generation sites. Examples of Genesis Energy's biodiversity and biosecurity management programmes are presented.

Weed Cordons - are they an effective biosecurity tool?

Hamish Lass, Bay of Plenty Regional Council, Rotorua

Hamish Lass is a Biosecurity officer with the Bay of Plenty Regional Council with a focused role in Aquatic freshwater biosecurity. Hamish has been working for the council for six years and prior to that was studying Environmental Management at Auckland University.

A two part trial was undertaken to test whether netted 'Weed Cordons' are likely to reduce the risk of invasive aquatic plants establishing in two of Rotorua's cleanest lakes, Rotomā and Ōkataina.
Invasive plants represent a significant biosecurity threat to our pristine environments. To reduce this threat, 'Weed Cordons' (a netting fence anchored to the lake bed) have been installed at boat ramps in Lakes Rotomā and Ōkataina. These lakes currently contain very few invasive species but have a high risk of incursions from neighbouring 'weedy' lakes such as Lake Rotoehu and Rotorua.

A trial was designed to test the effectiveness of the 'Weed Cordons' via a simulated incursion from a boat and trailer or fishing equipment. The trial was replicated in an un-netted area (non-treatment) next to each 'Weed Cordon' referred to as the 'ghost cordon'. The aim of the non-treatment was to test what would happen if there was no Weed Cordon present. The trial was

undertaken by releasing a total of 2880 weed fragments during a range of wind directions to gain an accurate understanding what would happen to the released fragments in a variety of conditions.

The results revealed that overall the boat ramp 'Weed Cordons' in the three locations retained 84.9% of all fragments released in all wind conditions. In contrast where no 'Weed Cordons' were present 85.2% of all fragments released were either not found or were found outside of the 'ghost cordon' range. The effect that wind direction had on fragment transportation produced some surprising results which warrant further investigation to determine whether future weed cordons can to be altered to maximise their effectiveness.

Overall it was concluded that the 'Weed Cordons' in these lakes are working effectively as a biosecurity tool but should be complemented with other initiatives such as portable wash down facilities, public awareness, pest surveillance and lake weed spraying.

Lake Taupo Protection Schemes and farm nutrient management

Lawrie Donald, Waikato Regional Council

The Lake Taupo Management Zone covers an area of 349,222 hectares surrounding and including Lake Taupo. The predominant geology of the area is Taupo pumice. The soils are extremely fragile and prone to severe gully, sheet, rill, stream bank and wind erosion with poor natural nutrient holding capacity.
The Lake Taupo Catchment Control Scheme objectives implemented from 1976 to 1989 was to ensure the long term protection of the water quality of Lake Taupo through sound land use practices, and the implementation of soil and water conservation. The scheme has a replacement value of $16m (2006 figures).

More recently to maintain water quality of Lake Taupo it has become essential to control Nitrogen as a nutrient entering the lake. To do this has seen the implementation of a 'nitrogen cap' through Variation Six to the Waikato Regional Council Land and Water Plan on all land use in the Taupo catchment.

Self-resetting traps for ground based pest control for conservation in New Zealand forests – early results

Craig Gillies, Nic Gorman, Anja Meduna and Antoni Nicholas
Department of Conservation

Craig has worked for DOC for 15 years as a predator scientist specialising in the ecology and management of introduced mammalian carnivores.

On 18 October 2010 the Minister of Conservation announced that the Government will spend $4 million to trial self-resetting traps through a rigorous testing programme. The project is the result of co-operation between the Green Party and the Government, and is part of a Memorandum of Understanding between the two parties. The purpose of the project is to test new self-resetting traps that are currently, or will shortly become, available to the public. The traps being tested are the Goodnature Ltd. automatic humane trap for possums and the Goodnature Ltd. V10 automatic trap for stoats and rats.

We completed our preliminary field efficacy trials of the self-resetting possum traps in September 2011, and then started operational scale trials of the devices in November 2011. These operational scale trials are being conducted at Trounson Kauri Park in Northland and in the Casino Block in Northern Te Urewera. The early results of these trials indicate that the self-resetting traps are successfully reducing possum abundances at both sites.

Preliminary field efficacy trials of small numbers of closely monitored “rapid-prototype” self-resetting stoat & rat traps started in mid-December 2011 and are progressing well. Depending on the outcome of these preliminary field efficacy trials, we will start operational scale trials of production versions of the self-resetting stoat & rat traps in July-2012.

How good are we at trapping possums? Possum interaction rates with traps

Samantha Brown and Bruce Warburton
Landcare Research, Lincoln

Sam works as a research technician in the wildlife ecology and management team at Landcare Research in Lincoln. A lot of her work focuses on animal behaviour as it relates to pest control. Recent projects she has been involved with include developing new traps, baits and toxins; improving the efficacy and humanness of current VTAs; TB transmission between possums; and looking at possum and rodent interactions with monitoring devices.

All possum control and monitoring devices require animals to encounter and interact with them in order for them to kill, capture or detect the animals. In the field we know when we have captured an animal, but often we do not know how often an individual might visit a trap but avoid capture. To answer this question we have a research project that aims to determine the encounter and interaction rates of possums with control and monitoring devices set in uncontrolled (naïve) and controlled (potentially shy) populations. The initial research has focused on how to increase the probability of capture (i.e. getting an interaction) given an animal has encountered a trap. Possums fitted with active RFID (radio frequency identification) collars were detected by an RFID scanner and PIR (passive infrared) movement sensor at 12m, 3m and as they triggered modified leg hold traps. Behaviour around the trap was observed using motion activated trail cameras. The study was conducted on farm land in South Canterbury which has been subject to infrequent, low intensity possum control. The interaction probability and behaviour of collared possums was compared between standard trap sets (i.e. NPCA monitoring protocol); hazed (side fenced) trap sets, and covered trap sets. Initial results show that hazing and covering traps can double the probability of capture. Further work to better understand possum behaviour when encountering and interacting with detection and trapping devices will improve our ability to more cost-effectively control our invasive mammals.

A cheap single capture trap for stoats and rats

Grant Morriss, Jane Arrow and Bruce Warburton
Landcare Research, Lincoln

Currently most stoat trapping in New Zealand is carried out using the DOC series kill traps that cost about $60 for the trap and accompanying tunnel. The Victor professional rat trap (costing $7–9) that has been approved for trapping short-tail weasel in Canada, was tested for stoats and ship rats as a possible cheap alternative.

Traps were modified by increasing spring strength, changing the treadle trigger to a pull trigger and adding a shroud above the trigger to ensure the target species head was correctly positioned when the trap was sprung. Traps were set in vertical (uncovered) and horizontal (covered) sets to test the versatility of the trap in different trapping situations. The trap passed the National Animal Welfare Advisory Committee trap testing guidelines, and use of this cheaper trap may allow greater numbers of traps to be used in a given area or even the use of multiple traps at single sites.

Eliminating wild deer in Northland - lessons learned from a multi-agency response.

Don Mckenzie, Biosecurity Senior Programme Manager, Northland Regional Council

Don began his career in the forestry industry graduating with a forestry degree in the mid-eighties then joining DOC in 1987 where he worked in pest management and threatened species as a Technical Support manager for much of the following 20 years. Don has spent the last six years with Northland Regional Council as a Biosecurity Manager and completed the Post Graduate Diploma in Biosecurity and Conservation through Auckland University.

Northland is free of wild deer populations however farm deer escapes and illegal releases of wild deer captured from outside the region pose an ongoing risk to Northland's natural environment and economy. A multi-agency response involving the Department of Conservation, Animal Health Board, Northland Regional Council and Deer Farmers Association was developed in 1997 to combat rising wild deer populations and respond to illegal releases. A dedicated team of professionals are on call seven days a week and respond to assist farmers and investigate illegal liberations.

Records show that deer escape from farms at an average rate of 6.7 escape events per annum and have involved whole herds of up to 125 animals. Escaped deer have been systematically recaptured or shot, and four of the five wild red deer and fallow deer herds described in 1997 have been eliminated. Detection of wild sika is now extremely difficult and although there has been no recent evidence of survivors confirmation of their eradication will require more time.

Despite a falling number of deer farms in Northland there remains a constant risk of deer escapes and illegal releases. An examination of illegal liberations and the reasons why deer escape from farms over the last 14 years paints a concerning picture and demonstrates the importance of maintaining a heightened level of preparedness.

Amendment of the National Pest Management Strategy for Bovine Tuberculosis - approaches to eradication of TB from wildlife in New Zealand

Matthew Hall, Animal Health Board, Wellington

Matthew is currently the Vector Operations Manager for the Animal Health Board, responsible for the implementation of the $60 million wild animal vector control programme across New

Zealand.Prior to working at the Animal Health Board Matthew led the Biosecurity team at the Northland Regional Council.

A review and amendment of New Zealand's National Pest Management Strategy for bovine tuberculosis (TB) has led to adoption of new strategy objectives for localised eradication of disease from the principal wildlife maintenance host and infecting vector for farmed cattle and deer - the brush-tailed possum *Trichosurus vulpecula*. Control and surveillance programmes will be aimed at eradication of TB from possums over a total area of 2.5 million hectares over a 15 year period. The amended strategy is intended to provide large-scale proof of concept that TB can be successfully eradicated from wildlife in New Zealand in the longer term, leading to eventual savings in control programmes needed to protect cattle and deer herds from infection. Achievement of strategy objectives will be supported by major technical and managerial improvements in wildlife TB control and surveillance, and these are reviewed.

WORKSHOPS

Weeds Database

Richard Bowman, Environment Southland

There have been many advances in recent years in the data handling and ecological modelling tools that have the potential to take the guess work out of weed management decision-making. To that end, the aim of this workshop is to answer the question “How can weed managers make better decisions about what species to manage and provide better weed risk management information for policy and funding purposes?”

Our expectation is that the workshop will produce a conceptual model of the processes and tools required to make better decisions. This model will be expressed in a clear diagram, will consider those tools already available, and will not be constrained by perceived cost.

The workshop is aimed at people involved in the strategic management of weeds. In particular it is targeted at those involved in planning, delivering and measuring the performance of work programmes and those involved in developing weed management policy. The workshop will explore the possibilities to utilise web based information management, spatial modelling, GIS, etc. to create new tools to assess and measure weed risk and impact into the future. These tools will have the potential to provide weed managers with the ability to make better-informed decisions about what weeds to manage and how much to invest in their management over time.

Progamme:

9:30 – 10:00 Introduction: “Weed risk modelling: What does it offer weed management?” Dr Graeme Bourdôt, Principal Scientist, AgResearch, Lincoln, will provide some background to the workshop using the example of a grass weed newly discovered in Canterbury to illustrate the components of a robust approach to deciding if and how this species should be managed.

10:00 – 10:15 Workshop – Stage 1: Brain-storming the question
During this phase of the workshop, Dr Mike Dodd, Senior Scientist, AgResearch, Palmerston North, will facilitate a brain-storming session during which participants will identify the drivers of, and barriers to, good weed management decision-making.

10:15 – 11:15 Workshop – Stage 2: Creating a conceptual model
During this phase of the workshop we will organise the identified drivers and barriers into groups (variables) for our conceptual model. This is likely to be a lively session during which we will share our different ideas on what a perfect weed management decision-making system looks like and how the components interact. Mike will facilitate this discussion and Graeme will construct a diagram representing our model.

Reporting back: The diagram of the model will be used by a workshop participant to report the findings to the full conference.

Training in the safe use and handling of new toxins

Steve Hix, Connovations Ltd

The development and registration of new toxins for vertebrate pest control is a significant development for vertebrate pest control

This workshop and training session is on the safe use and handling of both PAPP and Zinc Phosphide. It will cover how to prepare baits for placement in the field and may include some field work in the grounds of the conference venue. Each workshop is limited to 30 participants they will be run in tandem so can cater for a maximum of 60 in total. The only requirement is that they should ideally have had previous field experience with traps.

A record of the training will be provided that is sufficient for participants to gain the practical component of their controlled substances licences if not the full CSL.

Monitoring Vertebrate Pest Populations

Bruce Warburton, Landcare Research

Which monitoring method to use; traps, waxtag, chew cards, pellet counting and for which species possums, rabbits, mustelids, rodents feral cats and pigs?

This workshop will cover the key points in selecting correct monitoring methods with a focus on the strengths and weaknesses of each method as well as when and where to use them. The workshop It is aimed at two groups the first of which includes private landowners, those in QE 11 covenanted land and people in land-care groups who are taking action to control vertebrate pests and improve the conservation values of their own land.

The second group includes pest control contractors, staff of agencies involved with pest control (regional councils, Department of Conservation and the Animal Health Board).
The workshop will open with a brief over view of the issues, then include short presentations from technical expects on the issues to be followed by open discussion and a short field session in the conference venue grounds with some hands on experiences in the use of traps, waxtags and chew cards.

Pests and Communities

Craig Morley, Waiariki Institute of Technology

In truth, we have not been able to stem the tide of invasive organisms and their impact on New Zealand both from a biodiversity and economic perspective. While we have been able to eradicate a variety of invasive mammals from some offshore islands (and this has been a major step forward), as well as control weeds and pest animals in localised areas, the rest of New Zealand suffers from the insidious damage caused by a multitude of invasive organisms.

Currently, the Ministry for Primary Industries (MPI) manages pests that are considered a national priority under the Biosecurity Act 1993; the Department of Conservation manages pests on conservation estates, and the 16 Regional Authorities are responsible for controlling

pests within their geographical boundaries. In addition to these agencies, there are numerous other organisations involved in pest research and management, for example; Forest & Bird, NZ Landcare Trusts, District Councils, Animal Health Board, WWF, Landcare Research, HortResearch, AgResearch, NZ Biosecurity Institute, National Pest Control Agencies, and Tertiary institutions etc. Even though there are some excellent synergies between these organisations and many collaborate quite closely, we still have hundreds of invasive species impacting on our biodiversity and livelihoods. The questions arise: what is working, what is not, and how do we get even better results?

As mentioned, we have many organisations working on invasive species but depending on their expertise, function, funding timescales, and even political agendas they can have quite conflicting management strategies and information (provided via websites, signposts and brochures). Although well intentioned, this information is sometimes contradictory and confusing. Further, it is not unheard of for one organisation to "pass the buck" and say that this is not our concern and suggest speaking to "Organisation X" instead. With this, people may feel even less inclined or empowered to want to manage their pests. Thus, it is no wonder that many people do not know what is going on, where to turn to, and more importantly, how they could actually assist.

The problem for landowners, be they iwi, communities and trusts, farmers, foresters, and volunteer neighbourhood groups (wishing to look after their own "backyard") is that New Zealand does not have a single agency/portal (a one stop-shop) to provide these groups with the information they require. Currently, it is rather fragmented. Even neighbouring regional councils have differing 5 year regional pest management strategies (RPMS) because they are governed by elected representatives with their own budgets/agendas. Central government also seems to be withdrawing from certain responsibilities (e.g. biosecurity and conservation) in favour of letting the "volunteer" community manage their own issues/land.

In the 2008 report to Regional Councils on "The Future of Pest Management in NZ: a Think Piece", Enfocus Ltd identified and made recommendations to remove highly fragmented institutional arrangements, be more coordinated with standardised guidelines, provide clarity about roles, responsibilities and boundaries, introduce tenure neutrality, establish a statutory purpose, and develop a coherent and efficient Crown funding system. It is now 2012 and many of these issues have not been resolved.

Therefore, what I'd like to discuss is whether we should establish a single over-arching agency with responsibility for managing invasive pests within NZ. The workshop objective is to discuss the pros and cons of such an idea, how it might actually work, and more importantly, how could this agency get better community buy-in and interest in pest management so we can make some significant improvements. It is possible that with one agency, one portal, and one team of experts we might actually start winning and gaining public support and momentum. Thus, I'd like to put the challenge out there to see what others have to say.